

A new species of *Anthrenus* Geoffroy, 1762 (Coleoptera: Dermestidae) from Oman, with a key to related species

Marcin KADEJ¹ & Jiří HÁVA²

¹ Department of Biodiversity and Evolutionary Taxonomy, Zoological Institute, University of Wrocław, ul. Przybyszewskiego 63/77, 51-148 Wrocław, Poland.
E-mail: entomol@biol.uni.wroc.pl.

² Private Entomological Laboratory and Collection, Únětice u Prahy 37, 252 62 Praha-západ, Czech Republic.
E-mail: jh.dermestidae@volny.cz; <http://www.dermestidae.wz.cz>.

A new species of *Anthrenus* Geoffroy, 1762 (Coleoptera: Dermestidae) from Oman, with a key to related species. - *Anthrenus* (*Anthrenus*) *ardo* sp. n. from Oman is described. The habitus, antennae, and male genitalia are illustrated and compared to related species. The new species is characterized by eye with median side broadly and deeply emarginated at about anterior 1/3, 11-segmented antenna and broadly oval scales of the dorsum. Elytra covered with oval white patch on each side of the suture at its base, with three white, transverse, irregularly interrupted patches. The new species is most similar to *Anthrenus* (s. str.) *namibicus* Háva, 2000 and *A.* (s. str.) *flavipes flavipes* LeConte, 1854. Identification features to externally similar species of the genus are given. The most distinctive taxonomic characteristics concern the tibiae, the male genitalia and the 9th abdominal sternite are also given.

Keywords: Coleoptera - Dermestidae - *Anthrenus* - new species - taxonomy - morphology - comparative study - key - Oman.

INTRODUCTION

Genus *Anthrenus* is one of the 57 genera within the family Dermestidae (Háva 2007, 2010), and is characterized by the presence of scales covering almost a whole body. The scales often create colorful and very useful in identification patterns on the dorsum, and on the visible abdominal ventrites I-V. Currently genus includes 220 species, grouped in 10 subgenera (Háva 2003, 2008). Most of the species have been described from Palearctic and Afrotropical regions. Only five species have been recorded from Oman (Háva 2007, 2010). Two of them are members of the subgenus *Anthrenops* Reitter, 1881 (*A. cervenkai* Háva & Herrmann, 2006, *A. coloratus* Reitter, 1881), one of the subgenus *Anthrenodes* Chobaut, 1898 (*A. malkini* Mroczkowski, 1980), another one of *Anthrenus* s. str. (*A. flavipes flavipes* LeConte, 1854) and the last one of *Nathrenus* Casey, 1900 (*A. jakli* Háva, 2001). In the material from Oman studied recently we have found specimens representing a new species of the nominotypical subgenus. Its description is given below.

MATERIAL AND METHODS

The following abbreviations to measurements were made:

- total length (TL) - linear distance from anterior margin of pronotum to apex of elytra.
 pronotal length (PL) - maximum length measured from anterior margin to posterior margin.
 pronotal width (PW) - maximum linear transverse distance.
 elytral length (EL) - linear distance from shoulder to apex of elytron.
 elytral width (EW) - maximum linear transverse distance.

The following abbreviations are used in the text:

- IZDBET Institute of Zoology, Department of Biodiversity and Evolutionary Taxonomy, Wrocław, Poland.
 JHAC Private Entomological Laboratory & Collection, Jiří Háva, Prague-west, Czech Republic.
 MZLU Lund University, Lund, Sweden.
 NHMW Naturhistorisches Museum, Wien, Austria.
 MHNG Muséum d'Histoire Naturelle, Geneva, Switzerland.
 OXUM Oxford University Museum of Natural History, England.

Locality labels are cited in the original version. Separate labels are indicated by a slash (/). Author's remarks are in square brackets [].

Specimens have been labeled with red printed label of the following text: "HOLOTYPE [or PARATYPE, respectively] *Anthrenus* (*Anthrenus*) *ardoi* n. sp."

Morphological structures were cleared in boiling 10% KOH solution, rinsed in distilled water, mounted in glycerin, and then examined, measured, and illustrated under a Nikon Eclipse E 600® phase contrast microscope. External structures were examined under a Nikon SMZ-800® stereoscopic microscope. The dissected parts were placed with glycerin in a plastic microvial and attached to the pin of the specimen. Photos were taken with a Canon 500D® and a Nikon Coolpix 4500®.

Terminology: The terminology used in this paper follows Beal (1998) and Lawrence & Šlipiński (2010), distribution and classification follows the world catalogue of Háva (2010).

SYSTEMATIC PART

Megatominae Leach, 1815

Anthrenini Casey, 1900

Anthrenus Geoffroy, 1762

***Anthrenus* (*Anthrenus*) *ardoi* sp. n.**

Figs 1-9

MATERIAL STUDIED: Holotype (♂): Oman, Ghuzyan rd. Al Khabural-liberi 10.IV.1985 leg. Paul Ardö (MZLU). Allotype (♀): Oman, Yiti Wadi 7.IV.1985 Paul Ardö (MZLU).

Paratypes (16 exx. not sexed): (2 exx.) the same data as holotype (1 MZLU, 1 JHAC); (8 exx.) the same data as allotype (5 MZLU, 1 MHNG, 1 IZDBTE, 1 JHAC); (5 exx.) Oman, Al Sinain, 10.IV.1985, leg. Paul Ardö (4 MZLU, 1 JHAC); (1 ex.) Oman, Nizwa, 12.IV.1985 leg. Paul Ardö (MZLU).

ETYMOLOGY: The epithet is a patronym honoring Dr. Paul Ardö (NHMW), who collected the type series material.



FIGS 1-4

Anthrenus (Anthrenus) ardoi. (1) Habitus, dorsal aspect (holotype, male). (2) Habitus, dorsal aspect (allotype, female). (3) Visible abdominal ventrites I-V (holotype, male). (4) Visible abdominal ventrites I-V (allotype, female).

DIAGNOSIS: The new species can be differentiated from some of the species occurring in Oman by the:

- 1) The total number of antennomeres: in *A. ardoi* antennae with eleven antennomeres; in *A. cervenkai* Háva & Herrmann, 2006 and *A. coloratus* Reitter, 1881 with nine antennomeres; in *A. malkini* Mroczkowski, 1980 with ten antennomeres.
- 2) The morphology of eye: in *A. ardoi* eye with median side broadly and deeply emarginated at about anterior 1/3; in *A. cervenkai*, *A. coloratus* and *A. jakli* eye oval.

Due to variation in the dorsal setal pattern, the new species dorsal appearance resembles some forms of *Anthrenus* (s. str.) *namibicus* Háva, 2000 and *A.* (s. str.) *flavipes flavipes* LeConte, 1854 and can be easily confused with them. The distinction between these two species can be done based on the following characteristics:

- 1) In *A. ardoi* and *A. flavipes flavipes* tibial spines on first pair of legs absent; in *A. namibicus* present.
- 2) In *A. ardoi* claws of third pair of legs with one small denticle, in *A. flavipes flavipes* denticle not present; in *A. namibicus* three denticle present.
- 3) In *A. ardoi* apex of paramers slightly curved in to middle, paramers with apex and median lobe slender and narrower, median lobe with distinct extension in 1/2 of its length (Fig. 6); in *A. flavipes flavipes* and *A. namibicus*, although male genitalia are similar in general shape to *A. ardoi*, their parameres are broader; while in *A. namibicus* Háva, 2000 parameres are distinctly curved toward the middle, setae present only on apex of the parameres, median lobe with distinct extension in 3/5 of its length; in *A. flavipes flavipes* parameres are curved to ward the middle, setae present on apex and in the inner margin of parameres, median lobe without distinct extension.

- 4) In *A. ardoi* 9th abdominal sternite without distinct waist, with the same width throughout its length, the apex with cordate, deep indentation, sclerotization on the sides and only in the mid section of the upper part - extending to the top and underneath; in *A. flavipes flavipes* 9th abdominal sternite spatulate, with the apex narrow and flat, three times wider posteriorly than the apex width, distinct waist in a mid section present, sclerotization on the sides and the mid section only - extending underneath; in *A. namibicus* 9th abdominal sternite without distinct waist, with the same width throughout its length, the apex almost flat with slight and shallow indentation, sclerotization on the sides and only in the mid section of the upper part - extending to the top and underneath.

DESCRIPTION

Holotype male. *Body*: measurements (mm): TL 2.0 PL 0.6 PW 1.3 EL 1.4 EW 1.7 SL 1.1 SW 1.5. Body convex, rounded, integument brown, finely punctured, covered by broadly oval scales.

Scales: two times as long as width, their surface mostly with 14 complete, linear ribs; the apex of the scale is truncated or rounded and an apical lappet is not present (Figs 8-9).

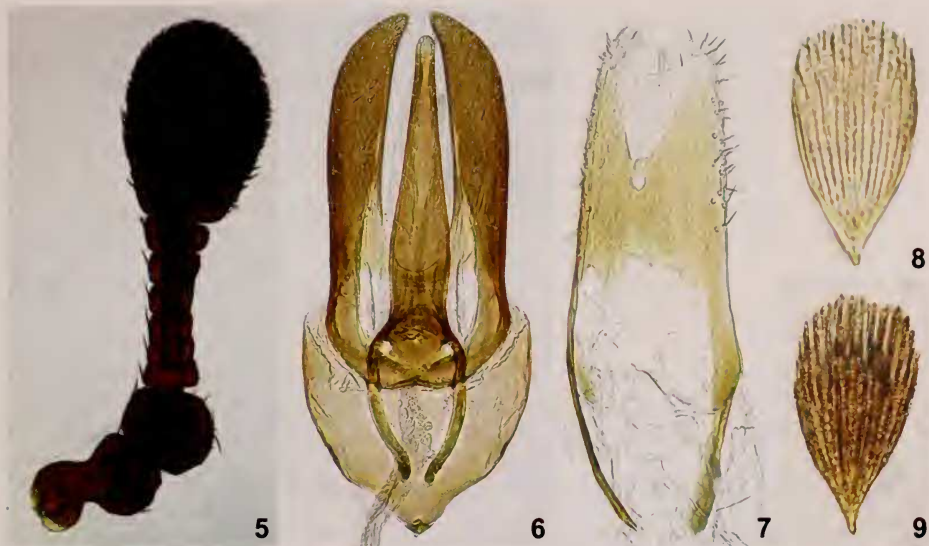
Head: is characterized by large convex eyes. Eye with median side broadly and deeply emarginated at about anterior 1/3. Median ocellus present on the frons. Antennae with 11 antennomeres, with 3-segmented antennal club (Fig. 5); antennomeres dark-brown. Antenna occupies whole cavity of antennal fossa. Antennal club in both sexes occupies less than half length of the antenna, and is distinctly longer than length of two basal segments combined. Antennal fossa is completely open along lateral margin of the pronotum and occupies 1/3 of the length of lateral margin. Dorsal margin of antennal cavity not visible from above. Dorsal surface covered with white, light- and dark brown scales (Figs 1-2) as follows: *pronotum* with mixed and irregular light-dark brown and white scales; small white patch near lateral angles enclosing light brown patch.

Elytra: covered with one oval white patch on each side of the suture at its base, with three white, transverse, irregularly interrupted patches: first in basal third, second close the middle, and third in apical fourth or fifth. Dark brown patches are present near humeri, in the central part of disc close to suture, and in basal third near the lateral margin. The remaining areas between bands are covered with light brown scales mixed with single white scales.

Ventral surface: with all scales white except for visible ventrites II-V covered with mix of yellowish (light brown) and white scales; first abdominal ventrite has stria (Figs 3-4).

Legs: brown and covered with white scales on dorsal surface. Tibiae without tibial spines. Tarsus with two slightly curved claws. Claws of the third pair of legs with one small denticle in the half of its length.

Male genitalia: as in figure 6. Parameres are deeply U-shaped, covered with few short setae on the lateral margins as well as in the central and inner areas. Median lobe in lateral view straight, with a distal end of aedeagus pointing up; in the frontal



FIGS 5-9

Anthrenus (Anthrenus) ardoi (holotype). (5) Male antenna. (6) Male genitalia. (7) 9th abdominal sternite. (8-9) Scales.

view, wider posteriorly, with narrow apodemes which occupying 1/3 of median lobe length (Fig. 6).

9th abdominal sternite as in figure 7. Pygidium with sub-basal, transverse, dark, carina-like line.

OBSERVED VARIATIONS: The dorsal patterns vary in color intensity (either darker or lighter). White patches occupies bigger or smaller areas on the pronotum and elytra (Figs 1-2). Body measurements for allotype (female): TL 1.9 PL 0.6 PW 1.2 EL 1.4 EW 1.5 SL 1.0 SW 1.4; for paratypes varying from (mm): TL 2.7-3.3 PL 0.6-0.7 PW 1.4-1.6 EL 2.1-2.4 EW 1.9-2.4.

SHORT KEY TO THE RELATED SPECIES AND TO THE KNOWN *ANTHRENUS* SPECIES FROM OMAN:

1. Antenna with 10-11 antennomeres 2.
- 1a. Antenna with 9 antennomeres 3.
2. Antenna with 10 antennomeres . *A. (Anthrenodes) malkini* Mroczkowski, 1980
- 2a. Antenna with 11 antennomeres 4.
3. Antennal club with two antennomeres, male antennomere 9 at least 4x longer than antennomere 8 *A. (Anthrenops) coloratus* Reitter, 1881
- 3a. Antennal club with three antennomeres, male antennomere 9 at least 2.5x longer than antennomere 7 *A. (Anthrenops) cervenkai* Háva & Herrmann, 2006
4. Inner margin of eye emarginated 5.
- 4a. Inner margin of eye oval *A. (Nathrenus) jakli* Háva, 2001

5. First pair of legs with tibial spines *A. (s. str.) namibicus* Háva, 2000e
- 5a. First pair of legs without tibial spines 6.
6. Ventrites II-V covered with mix of yellowish (light brown) and white scales; 9th abdominal segment without distinct waist, with same width throughout its length, apex of segment with cordate, deep indentation; apex of paramers slightly curved in to middle, paramers with apex and median lobe slender and narrower, median lobe with distinct extension in 1/2 of its length *A. (s. str.) ardoi* sp. n.
- 6a. Ventrites I-V covered with white and light-brown scales; light-brown scales cover posterior margin of ventrites I-V and middle section of ventrite V; 9th abdominal sternite spatulate, with the apex narrow and flat, three times wider posteriorly than the apex width, distinct waist in a mid section present; parameres curved toward middle, setae present on apex and in inner margin of parameres, median lobe without distinct extension *A. (s. str.) flavipes flavipes* LeConte, 1854

DISCUSSION: Many of the species of the genus *Anthrenus* are similar externally. However, there are some species that have varying scales color and patterns (*A. flavipes flavipes* LeConte, 1854, *A. lepidus* LeConte, 1854, *A. pimpinellae pimpinellae* (F., 1775), *A. scrophulariae scrophulariae* (L., 1758), *A. verbasci* (L., 1767); compare with Beal 1998, Hinton 1945, Kadej 2005a, b). Thus specimens of particular species can be often more similar to other distinct species than to typical form. As a result identification should be based on the general morphology of the male genitalia and details in structure of median lobe, shape of the 9th abdominal segment and respectively galea with lacinia in all cases.

ACKNOWLEDGEMENTS

We would like to thank to Prof. L. Borowiec (Zoological Institute, Wrocław University, Poland) for help in improving this manuscript, to R. Danielsson (MZLU) for the loan of material and J. Cooter (OXUM) for help with translation of the manuscript. This work was supported by funding (project no 1244/M/IZ/2011) from the Institute of Zoology, University of Wrocław, Poland.

REFERENCES

- BEAL, R. S. 1998. Taxonomy and Biology of Nearctic Species of *Anthrenus* (Coleoptera: Dermestidae). *Transactions of the American Entomological Society* 124: 271-332.
- CASEY, T. L. 1900. Review of the American Corylophidae, Cryptophagidae, Tritomidae and Dermestidae with other studies. *Journal New York Entomological Society* 8: 51-172.
- CHOBOUT, A. 1898. Description de quelques espèces et variétés nouvelles de Coléoptères algériens. *Revue d'Entomologie Caen* 17: 74-88.
- FABRICIUS, J. C. 1775. Systema Entomologie, sistens Insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus. *Flensburgi et Lipsiae: Officina Libraria Kortii*, xxxii + 832 pp.
- GEOFFROY, E. L. 1762. Histoire abrégée des Insectes qui se trouvent aux environs de Paris, dans laquelle ces animaux sont rangés suivant un ordre méthodique. 1. Paris: Durand, xxviii + 523 pp. + 10 pl.

- HÁVA, J. 2000. New interesting Dermestidae (Coleoptera) from the world with descriptions of ten new species. *Veröffentlichungen Naturkundemuseum Erfurt* 19: 161-171.
- HÁVA, J. 2001. *Anthrenus* (*Nathrenus*) *jakli* sp. n. (Coleoptera: Dermestidae) from the Sultanate of Oman, and distributional notes on some other *Anthrenus* species. *Acta Societatis Zoologicae Bohemiae* 65: 1-3.
- HÁVA, J. 2003. World Catalogue of the Dermestidae (Coleoptera). *Studie a Zprávy Oblastního Muzea Praha-východ v Brandýse nad Labem a Staré Boleslavi, Supplementum* 1: 1-196.
- HÁVA, J. 2007. Dermestidae (pp. 57, 299-320). In: Löbl, I. & Smetana, A. (eds). Catalogue of Palaearctic Coleoptera. Volume 4. Elateroidea, Derodontoidea, Bostrichoidea, Lymexyloidea, Cleroidea and Cucujoidea. *Apollo Books, Stenstrup*, 935 pp.
- HÁVA, J. 2008. Description of a New Subgenus *Setapeacockia* subgen. nov. of the genus *Anthrenus* Geoffroy, 1762 (Coleoptera: Dermestidae: Anthrenini) from Central Asia. *Litvijas Entomologos* 45: 43-45.
- HÁVA, J. 2010. Dermestidae of the World (Coleoptera). An interactive manual (opened in 2004), available from: <http://www.dermestidae.wz.cz> (last modification 18.01.2010)
- HÁVA, J. & HERRMANN, A. 2006. Additional notes on some Dermestidae and new species from Yemen – Part I. *Mitteilungen des Internationalen Entomologischen Vereins* 31:1-10.
- HINTON, H. E. 1945b. A Monograph of the Beetles Associated with Stored Products. *Volume 1. London: Order of the Trustees of the British Museum*, viii + 443 pp.
- KADEJ, M. 2005a. Morphological variability of *pimpinellae*-group (Coleoptera: Dermestidae: *Anthrenus*) with a key to identification. Part 1. *Polskie Pismo Entomologiczne* 74: 117-135.
- KADEJ, M. 2005b. Morphological variability of *Anthrenus* (Coleoptera: Dermestidae). Part 2. *scrophulariae*-group with a key to identification. *Polskie Pismo Entomologiczne* 74: 509-521.
- LAWRENCE, J. F. & ŚLIPIŃSKI A. 2010. 6.1. Dermestidae Latreille, 1804 (pp. 198-206). In: LESCHEN, R. A. B., BEUTEL, R. G., & LAWRENCE, J. F. (eds). Coleoptera, beetles. Volume 2: Morphology and systematics (Elateroidea, Bostrichiformia, Cucujiformia partim). Handbook of Zoology, a natural history of the phyla of the animal kingdom. Volume IV. Arthropoda: Insecta. Part 38 (KRISTENSEN, N. P. & BEUTEL, R. G., eds). *Walter de Gruyter, Berlin, Germany*.
- LECONTE, J. L. 1854. Synopsis of the Dermestidae of the United States. *Proceedings of the Academy of the Natural Sciences of Philadelphia* 7: 106-113.
- LINNAEUS, C. von 1758. *Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Editio decima, reformata. *Tomus I. Holmiae: Laurenti Salvii*, IV + 824 + 1 pp.
- LINNAEUS, C. von 1767. *Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Editio decima tertia, ad Editionem duodecimam reformatam. *Tom I., Pars II. Holmiae: Laurentii Salvii*, pp. 533-1327 + 37 pp.
- MROCZKOWSKI, M. 1980. Insects of Saudi Arabia. Coleoptera: Fam. Dermestidae. Part 2, Description of three new species. *Fauna Saudi Arabia* 2: 124-126.
- REITTER, E. 1881. Bestimmungs-Tabellen der europäischen Coleopteren. III Heft. I. Auflage. Enthaltend die Familien: Scaphidiidae, Lathridiidae und Dermestidae. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* 30: 41-94.